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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,496	02/16/2006	David Robinson	LSN-36-1957	1185

23117 7590 10/29/2008

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EXAMINER	
BERHANE, YOSIEF H	

ART UNIT	PAPER NUMBER
4144	

MAIL DATE	DELIVERY MODE
10/29/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,496	ROBINSON ET AL.	
	Examiner	Art Unit	
	YOSIEF BERHANE	4144	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *02/16/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-10, 12-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *11 and 19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *05/19/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-19 have been examined and are pending.

Information Disclosure Statement

2. An initialed and dated copy of Applicant's IDS form 1449 submitted 05/19/2006, is attached to the instant Office action.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned

with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. **Claim 1-4,7,12-13 and 15-16** provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim **1-6,11,12 and 16** of copending Application No. 20060126524. Although the conflicting claims are not identical, they are not patentably distinct from each other because the breadth of the claims disclosed is similar in scope.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

As per claim 1, the copending application teaches a data relay device, the device having receiving means for receiving payload data from a data source (Claim 1, Copending application discloses a mobile data wireless relay device, the device having: receiving means for receiving payload data from a data source),

a buffer for storing payload data for subsequent transmission (Claim 1, Copending application discloses a buffer for storing payload data for subsequent transmission),

means for receiving status data from similar devices (Claim 1, Copending application discloses means for receiving status data from similar devices),

status data generation means for generating status data, the status data being derived from the quantity of data in the buffer store and the status data received from other devices (Claim 1, Copending application discloses status data generation means for generating status data, the status data being derived from the quantity of data in the buffer store and the status data received from other devices),

and comprising data relating to the separation of the device from other devices (Claim 1, Copending application discloses and comprising data relating t`o the position of the device),

the quantity of data in the buffer store means for determining a scalar status value (Claim 1, Copending application discloses the quantity of data in the buffer store a scalar forwarding value and a forwarding direction),

determined by the quantity of data stored in the buffer and its separation from nearby sensors (Claim 1, Copending application discloses the status data being derived from the quantity of data in the buffer store and the status data received from other devices, and comprising data relating to the position of the device)

status transmitter means for transmitting the status value to other devices (Claim 1, Copending application discloses status transmitter means for transmitting status data to other devices)

selection means for identifying, from the status data received from other devices, a receiving device having a status value which varies from its own status value in a manner indicative that payload data may be forwarded to it (Claim 1, Copending application discloses selection means for identifying from the status data a receiving device to which the payload data is to be forwarded, the receiving device being located in a position indicated by the forwarding

direction. Note, the examiner understands the following claim language **" a status value which varies from its own status value in a manner indicative that payload data may be forwarded to it "** to mean forwarding payload data to a receiving device by a selection means based on status data.**),**

and payload transmission means for transmitting the payload data to the identified receiving device (Claim 1, Copending application discloses payload transmission means for transmitting the payload data to the receiving device).

As per claim 2, Copending application claims teaches a data relay device according to claim 1, comprising means for receiving payload data transmitted by other similar devices (Claim 2, Copending application discloses a mobile data wireless relay device according to claim 1, comprising means for receiving payload data transmitted by other similar devices).

As per claim 3, Copending application teaches a data relay device according to claim 1, further comprising a data source (Claim 3, Copending application discloses a mobile data wireless relay device according to claim 1, further comprising a data source).

As per claim 4, Copending application teaches a data relay device according to claim 1, wherein the selection means is arranged to only identify a suitable receiving device if the scalar status value meets one or more threshold criteria (Claim 4, Copending application discloses a mobile data wireless relay device according to claim 1, wherein the selection means is arranged to only identify a suitable receiving device if the scalar forwarding value meets a threshold criterion.).

As per claim 7, Copending application teaches a data relay device according to any claim 1, further comprising condition-monitoring means for monitoring the expected lifetime of

the device, and adjusting the scalar status value accordingly (Claim 5, Copending application discloses a mobile data wireless relay device according to claim 1, further comprising condition-monitoring means for monitoring the expected lifetime of the device, and adjusting the scalar forwarding value accordingly).

As per claim 12, Copending application teaches a method of operating a plurality of data relay devices, comprising (Claim 6, Copending application discloses a method of operating a plurality of mobile data wireless relay devices):

collecting data in buffer stores in one or more such devices (Claim 6, Copending application discloses collecting data in buffer stores in one or more such devices),

exchanging status data between the devices (Claim 6, Copending application discloses exchanging status data between the devices),

the status data comprising data relating to the separation between the devices (Claim 6, Copending application discloses the status data comprising data relating to the positions of the devices,),

the quantity of data in their buffer stores each device defining, from the status data, a scalar status value (Claim 6, Copending application discloses the quantity of data in their buffer stores each device defining, from the status data, a forwarding direction towards which the payload data in its buffer store is to be forwarded. **Note, the examiner corresponds "a forwarding direction towards which the payload data is to be forwarded" from the copending application to the claim language "scalar status value" in the instant application.)**

determined by the quantity of data stored in the buffer and its separation from other sensors (Claim 1, Copending application discloses the status data being derived from the quantity of data in the buffer store and the status data received from other devices, and comprising data relating to the position of the device)

transmitting the status value to other devices and receiving the status values of other devices (Claim 6, Copending application discloses exchanging status data between the devices)

identifying, from the status data received from other devices, a receiving device having a status value which varies from its own status value in a manner indicative that payload data may be forwarded to it (Claim 1, Copending application discloses identifying from the status data a receiving device to which the payload data is to be forwarded, the receiving device being located in a position indicated by the forwarding direction. Note, the examiner understands the following claim language **" a status value which varies from its own status value in a manner indicative that payload data may be forwarded to it "** to mean forwarding payload data to a receiving device by a selection means for identifying/determining path route based on status data.)

and transmitting the payload data to the identified receiving device (Claim 6, Copending application discloses transmitting the stored payload data to a device located in the forwarding direction).

As per claim 13, the Copending application teaches a method according to claim 12, wherein data is only transmitted from a first device to a second device located in its forwarding direction if the scalar status value derived from the status data meets one or more predetermined threshold criteria (Claim 11, Copending application discloses wherein data is only transmitted

from a first device to a second device located in its forwarding direction if a scalar forwarding value derived from the status data exceeds a predetermined value).

As per claim 15, Copending application teaches a method according to claim 12, wherein the status data includes a measure of the expected lifetime of the device (Claim 12, Copending application discloses wherein the status data includes a measure of the expected lifetime of the device).

A method according to claim 12, wherein payload data is transmitted, by means of one or more of the wireless relay devices, to a target sink device defined by a predetermined scalar status value (Claim 6, Copending application discloses the quantity of data in their buffer stores each device defining, from the status data, a forwarding direction towards which the payload data in its buffer store is to be forwarded).

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1-3, 12, 16** are rejected under 35 U.S.C. 102(e) as being anticipated by Publication 2003/0204587 filed on Apr. 29, 2002 to Billhartz.

As per claim 1, 12 and 16 Billhartz teaches a data relay device (Billhartz discloses a mobile ad hoc network includes a plurality of wireless mobile nodes and a plurality of wireless communication links connecting the plurality of nodes together, Abstract.),

the device having receiving means for receiving payload data from a data source (Paragraph 0016, Billhartz discloses that each mobile node comprises a communications device to wirelessly communicate with other nodes of the plurality of nodes via the wireless communication links, and a controller to route communications via the communications device.),

a buffer for storing payload data for subsequent transmission (Paragraph 0064, Billhartz discloses that each node may propagate buffered traffic when required resources become available),

means for receiving status data from similar devices (Paragraph 0016, Billhartz discloses that Each mobile node comprises a controller to route communications, where the controller includes a traffic information buffer to store the traffic information in a traffic database. Thus, each node receives traffic information used to communicate/route paths accordingly. **Note, the examiner understands status data to mean information used to route packets efficiently in an ad-hoc network, thus "status data" corresponds to "traffic information"**),

status data generation means for generating status data (Paragraph 0016, Billhartz discloses a traffic information generator to generate traffic information),

the status data being derived from the quantity of data in the buffer store and the status data received from other devices (Paragraph 0032, Billhartz discloses using traffic information to discover routing paths. The traffic information is obtained by transmitting a quality-of-service route request RREQQ from the source node to discover routing to the destination node based upon a QoS parameter. Furthermore in Paragraph [0053], Billhartz discloses that the route request RREQQ includes an updatable QoS link metric, which includes node queue size. Thus,

Billhartz uses the quantity of data in the buffer store along with other status data received from neighboring devices to determine and update traffic information),

and comprising data relating to the separation of the device from other devices (Paragraph 0032, Billhartz discloses that the traffic information is obtained by using a QoS parameter which includes hop count. Note, the examiner understands the claim language "separation of the device from other devices" to correspond to "hop count"),

the quantity of data in the buffer store means for determining a scalar status value (Paragraph 0053, Billhartz discloses that a node QoS tag value is used to make traffic admission control decisions. The node QoS tag value is a function of at least one node specific QoS metric. Billhartz discloses that the QoS metric may include node queue size.)

determined by the quantity of data stored in the buffer and its separation from nearby sensors (Paragraph 0032, Billhartz discloses using traffic information to discover routing paths. The traffic information is obtained by transmitting a quality-of-service route request RREQQ from the source node to discover routing to the destination node based upon a QoS parameter. Furthermore in Paragraph [0053], Billhartz discloses that the route request RREQQ includes an updatable QoS link metric, which includes node queue size. Thus, Billhartz uses the quantity of data in the buffer store along with other status data received from neighboring devices to determine and update traffic information. **Note; the examiner corresponds status value as corresponding to traffic information. Traffic information includes QoS parameters and QoS link metrics.**),

status transmitter means for transmitting the status value to other devices (Paragraph 0032, Billhartz discloses transmitting a quality-of-service (QoS) route request RREQQ from the

source node to discover routing to the destination node based upon a QoS parameter. The route request RREQQ includes a QOS flow identifier and an updatable QoS link metric.)

selection means for identifying from the status data received from other devices a receiving device having a status value which varies from its own status value in a manner indicative that payload data may be forwarded to it (Paragraph 0032, Billhartz discloses transmitting a quality-of-service (QoS) route request RREQQ from the source node to discover routing to the destination node 4based upon a QoS parameter. Furthermore, in paragraphs 0034, Billhartz discloses where a source node selects a route to the destination node based upon the QoS route metrics.),

and payload transmission means for transmitting the payload data to the identified receiving device (Paragraph 0016, Billhartz discloses that each mobile node comprises a communications device to wirelessly communicate with other nodes of the plurality of nodes via the wireless communication links, and a controller to route communications via the communications device).

As per claim 2, Billhartz teaches a data relay device according to claim 1, comprising means for receiving payload data transmitted by other similar devices (Paragraph 0016, Billhartz discloses that each mobile node comprises a communications device to wirelessly communicate with other nodes of the plurality of nodes via the wireless communication links, and a controller to route communications via the communications device).

As per claim 3, Billhartz teaches a data relay device according to claim 1, further comprising a data source (Paragraph 0034, Billhartz discloses a source node 1 then selects a route to the destination node 4 based upon the QoS route metrics).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. **Claims 4-10, 13-15, 17-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Billhartz as applied to claim 1-2 above, and further in view of Patent 6,735,448 to Krishnamurthy et al (hereinafter Krishnamurthy) and Patent 6,904,275 to Stanforth as well as Non-Patent Literature, "Power-Aware Localized Routing in Wireless Networks" by Ivan et al (Hereinafter Ivan).

As per claim 4, Billhartz teaches a data relay device according to claim 1.

Although Billhartz discloses a means for obtaining traffic information to determine an appropriate route path, the reference is silent on the claim language wherein the selection means is arranged to only identify a suitable receiving device if the scalar status value meets one or more threshold criteria

However, Krishnamurthy teaches, in Col. 5, lines 10-17, an ad hoc network where nodes find the most efficient path by obtaining a link cost based on transmitted power, thus the objective is to route the packet from the source to the destination through the minimum power path. Furthermore, Col. 5, lines 18-26, Krishnamurthy discloses where a threshold value called the MinRecPower is used to determine the power level at which a mobile node has to transmit in order to directly reach a neighboring node.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Billhartz by using a threshold criterion as a basis for selecting a suitable receiving device as suggested by Krishnamurthy. The modification would benefit the system of Billhartz by improving the efficiency of determining route paths while minimizing the power consumption utilized in an ad-hoc network.

As per claim 5, Billhartz and Krishnamurthy teach a device according to claim 4. Furthermore, the combination teaches wherein a threshold criterion is that the remaining battery power is at least sufficient to transmit all the data currently in the buffer (Col. 5, lines 18-26, Krishnamurthy discloses where a threshold value called the MinRecPower is used to determine the power level at which a mobile node has to transmit in order to directly reach a neighboring node. Furthermore, in Col. 10 lines 67 and Col. 11, lines 1-3, Krishnamurthy discloses that each

node can communicate with any other node as long as the power at the receiving node is larger than the minimum received power needed for reliable communication.)

The examiner provides the same rationale stated in claim 4, as a motivation to combine the system of Billhartz and Krishnamurthy.

As per claim 6, Billhartz and Krishnamurthy teach a device according to claim 4. Furthermore, Billhartz teaches having means for selecting a threshold criterion as a function of elapsed time from a predetermined start point (Paragraph 0053, Billhartz discloses a method for controlling traffic admission in the mobile ad hoc network by transmitting quality-of-service (QoS) route requests RREQQ from a source node, in order to discover traffic routing based upon a QoS parameter. The QoS parameter may be based upon end-to-end delay, and end-to-end delay variation. An end-to-end delay is a measure of elapsed time from a predetermined start point).

As per claim 7, Billhartz teaches a data relay device according to any claim 1.

Billhartz is silent on the claim language further comprising condition-monitoring means for monitoring the expected lifetime of the device .

However, Stanforth teaches in Col. 3, lines 49-55, a criterion to the routing decision of an ad-hoc, peer-to-peer radio system, which additional criterion includes information about the status of the battery-charge of each battery which may possibly serve as a link for call-routing of call over the radio system. Furthermore in Col. 3, lines 36-40, Stanforth discloses a method directed to the provision of the consideration of the status of the battery-charge of each terminal forming a link in an ad-hoc network.

The reference is further silent on the claim language and adjusting the scalar status value accordingly

However, Stanforth discloses routing algorithms to include information about the battery state of each terminal, such that if a choice of routes is available, on of which includes a low battery terminal, an alternate route will be selected, Col. 4 lines 7-24. Furthermore, in Col. 3, lines 64-67, Stanforth discloses a system where the battery-status information calculated and transmitted to other terminals is used in conjunction with least-energy routing. Thus, Stanforth teaches including the condition of battery life as a criterion for determining routing information.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Billhartz by monitoring the expected lifetime of the devices within the network and determining a scalar status value for routing information as suggested by Stanforth. The suggestion for the modification is to ensure efficient routing of data by collecting and monitoring information regarding the battery life of all the available nodes in an ad-hoc network, such that routing paths can be chosen accordingly and reliably.

As per claim 8, Billhartz teaches a device according to claim 1.

The reference is silent on the claim language wherein the separation between devices is determined from the power required to make a transmission between them.

However Ivan discloses that if nodes can adjust their transmission power by knowining the location of their neighbors, then a power metric can be used that depends on distance between nodes. The distance between neighboring nodes can be estimated on the basis of incoming signal strengths. Section 1.1 titled "Minimize energy required per routing task".

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Billhartz by using power requirement as a metric for determining the distance between nodes as suggested by Ivan. The modification would benefit

the system of Billhartz by obtaining a measuring criterion for routing data that will allow minimizing the power consumption of the ad-hoc network as well as minimizing the energy required to route data to nodes within an ad-hoc network.

As per claim 9, Billhartz teaches a device according to claim 1.

The reference is silent on the claim language comprising means for determining the power that would be required to transmit payload data to an identified receiving device, and means for generating a scalar status value related to that power requirement.

However, in Col. 5, lines 19-27, Krishnamurthy discloses that Each node in the wireless ad-hoc network is equipped with a squelch circuit wherein the squelch circuit requires that the received signal power be greater than a minimum power level, MinRecvPower. The value of MinRecvPower helps determine the power level at which a mobile node has to transmit in order to directly reach a neighboring node. Furthermore, in Col. 5, lines 7-17, Krishnamurthy dislcoses that link costs are chosen to be the transmitted powers. Therefore, the objective is to route the packet from the source to the destination through the minimum power path.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Billhartz by using power requirement as a metric or link cost used for determining routing information as suggested by Krishnamurthy. The modification would benefit the system of Billhartz by improving the efficiency of determining route paths while minimizing the power consumption utilized in an ad-hoc network.

As per claim 10 and 18, the combination of Billhartz and Krishnamurthy teach a device according to claim 9.

Furthermore, the combination teaches wherein the identified receiving device on which the power determination is based is the device selected for transmission on a previous determination (Col. 5, lines 7-17, Krishnamurthy discloses that link costs are chosen to be the transmitted powers. Therefore, the objective is to route the packet from the source to the destination through the minimum power path. **Note, since link costs are based on transmitted powers, the same receiving device may be selected more then once if it is determined that the same receiving device is to be used in order to achieve the minimum power path**)

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Billhartz by using power requirement as a metric or link cost used for determining routing information as suggested by Krishnamurthy. The modification would benefit the system of Billhartz by improving the efficiency of determining route paths while minimizing the power consumption utilized in an ad-hoc network.

As per claim 13, Billhartz teaches a method according to claim 12.

The reference is silent on the claim language wherein data is only transmitted from a first device to a second device located in its forwarding direction if the scalar status value derived from the status data meets one or more predetermined threshold criteria.

However, Stanforth discloses where a routing algorithm is extended to include information about the battery state of each terminal, such that if a choice of routes is available, one of which includes a low battery terminal, an alternate route will be selected. Thus, data is routed to a destination node only if there is sufficient battery to support the communication.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Billhartz by using a threshold criterion as a basis for selecting

a suitable receiving device as suggested by Stanforth. The modification would benefit the system of Billhartz by improving the efficiency of determining route paths while minimizing the power consumption utilized in an ad-hoc network.

As per claim 14, the combination of Billhartz and Stanforth teach a method according to claim 13.

Furthermore, the combination teaches wherein a threshold criterion is that the remaining battery power is at least sufficient to transmit all the data currently in the buffer (In paragraph 0064, Billhartz discloses that traffic information obtained by using a QoS parameter is utilized in order to route packets accordingly. Furthermore, Billhartz discloses that, if a required QoS level is not upheld, traffic will be buffered and only transmitted when recourses become available. Billhartz does not disclose battery life as the criterian for propagating the data currently stored in the buffer. However, Stanforth teaches a routing algorithm to include information about the battery state of each terminal, such that if a choice of routes is available, one of which includes a low battery terminal, an alternate route will be selected. Col. 4 lines 7-24).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Billhartz by monitoring the expected lifetime of the devices within the network and determining a scalar status value for routing information as suggested by Stanforth. The suggestion for the modification is to ensure efficient routing of data by collecting and monitoring information regarding the battery life of all the available nodes in an ad-hoc network, such that routing paths can be chosen accordingly and reliably.

As per claim 15, Billhartz teaches a method according to claim 12.

The reference is silent on the claim language wherein the status data includes a measure of the expected lifetime of the device

However, Stanforth teaches a routing algorithm to include information about the battery state of each terminal (Col. 4 lines 7-24)

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Billhartz by monitoring the expected lifetime of the devices within the network and determining a scalar status value for routing information as suggested by Stanforth. The suggestion for the modification is to ensure efficient routing of data by collecting and monitoring information regarding the battery life of all the available nodes in an ad-hoc network, such that routing paths can be chosen accordingly and reliably.

As per claim 17, Billhartz teaches a method according to claim 12.

The reference is silent on the claim language wherein the power that would be required to transmit payload data to an identified receiving device is determined and a scalar status value is generated related to that power requirement.

However, in Col. 5, lines 19-27, Krishnamurthy discloses that Each node in the wireless ad-hoc network is equipped with a squelch circuit wherein the squelch circuit requires that the received signal power be greater than a minimum power level, MinRecvPower. The value of MinRecvPower helps determine the power level at which a mobile node has to transmit in order to directly reach a neighboring node. Furthermore, in Col. 5, lines 7-17, Krishnamurthy dislcoses that link costs are chosen to be the transmitted powers. Therefore, the objective is to route the packet from the source to the destination through the minimum power path.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Billhartz by using power requirement as a metric or link cost used for determining routing information as suggested by Krishnamurthy. The modification would benefit the system of Billhartz by improving the efficiency of determining route paths while minimizing the power consumption utilized in an ad-hoc network.

Allowable Subject Matter

Claim 11 and 19 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. Prior arts made of record, not relied upon:

US 2006/0206857 to Liu et al. discloses Maximum Lifetime routing in wireless Ad-Hoc Networks

US 2004/0029553 to Cain discloses multiple path reactive routing in a mobile Ad-Hoc Network

US 2004/0022224 to Billhartz discloses a Multi-channel Mobile Ad-Hoc Network

US 2002/0039357 to Lipasti et al. discloses Addressing and Routing in mobile Ad-Hoc Networks.

US 6,385,174 to Li discloses a Method and apparatus for transmission of node link status messages throughout a network with reduced communication protocol overhead traffic

US 5,987,011 to Toh discloses routing method for Ad-Hoc mobile networks

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yosief Berhane whose telephone number is (571) 274-7164. The examiner can normally be reached at 7:30-5:00 Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Taghi T. Arani can be reached at (571) 272-3787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Y.B/

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